3.3.8.9 Great Lakes Coastal Fen

3.3.8.9.1 Community Overview

This open peatland community occurs primarily along the shorelines of the Great Lakes, near the mouths of estuarine streams, as well as in association with sandspit landforms. This community is locally common along the southwestern shore of Lake Superior, because the basin is slowly subsiding due to differential isostatic rebound from the last episode of Pleistocene glaciation. This has created conditions along the Wisconsin shore that favor the development of drowned river mouths, sandspits, and extensive peatland complexes. The shore fens are generally in direct contact with clear, cold, circumneutral (pH ~7) waters of low nutrient status.

A characteristic floating sedge mat is dominated by wire-leaved graminoid plants, including woolly sedge, twig-rush, sweet gale, and buckbean. Other common herbs in the floristically diverse coastal fens of the Lake Superior region include marsh horsetail, marsh bellflower, intermediate bladderwort, lesser bladderwort, water bulrush, elliptic spikerush, narrow-leaved willow-herb, water-parsnip, and bog willow. The rare coast sedge and sooty beak-rush are locally common in some coastal fens on the Apostle Islands. The floating sedge mat is often bordered on the downslope side by a lagoon that supports marsh vegetation composed of varying mixtures of submergent, floating-leaved, and emergent species. Toward higher ground and in the shallower portions of the peatland basins, the mat is grounded. Sphagnum mosses become increasingly important and accumulate as peat, and there are significant changes in fen composition. These sphagnum-based, herbaceous peatland communities are classified as poor fen.

Coastal fens are distinguished from the more acidic open bogs and poor fens (which may adjoin them in the same wetland complex) by their scarcity or lack of Sphagnum moss species, low ericad cover, higher pH, and the presence of a direct hydrologic connection to the waters of the Great Lakes. They are distinguished from rich fens by their lower pH and the absence of "rich" peatland indicator species such as linear-leaved sundew, grass-of-parnassus, false asphodel, and beaked spikerush.

3.3.8.9.2 Vertebrate Species of Greatest Conservation Need Associated with Great Lakes Coastal Fen

Nine vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with Great Lakes coastal fens (Table 3-192).

Table 3-192. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with Great Lakes coastal fen communities.

Species Significantly Associated with Great Lakes Coastal Fens
Birds
Le Conte's Sparrow
Herptiles
Four-toed Salamander
Species Moderately Associated with Great Lakes Coastal Fens
Birds
Trumpeter Swan
Yellow Rail
Herptiles
Boreal Chorus Frog
Pickerel Frog
Mammals
Silver-haired Bat
Eastern Red Bat
Hoary Bat

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-192 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both Great Lakes coastal fens and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of Great Lakes coastal fens in each of the Ecological Landscapes (Tables 3-193 and 3-194).

- Using the analysis described above, a species was further selected if it had both a significant association with Great Lakes coastal fens and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of Great Lakes coastal fens. These species are shown in Figure 3-47.

Table 3-193. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with Great Lakes coastal fen communities and their association with Ecological Landscapes that support Great Lakes coastal fens.

Great Lakes Coastal Fen	Birds (1)*	Herptiles (1)
Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Le Conte's Sparrow	Four-toed Salamander
MAJOR		
Superior Coastal Plain		
IMPORTANT		
Northern Lake Michigan Coastal		

Color Key

= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

*** The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.**

Table 3-194. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with Great Lakes coastal fen communities and their association with Ecological Landscapes that support Great Lakes coastal fens.

Great Lakes Coastal Fen	Birds (2)*		Herptiles (2)		Mammals (3)		
Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Trumpeter Swan	Yellow Rail	Boreal Chorus Frog	Pickerel Frog	Silver-haired Bat	Eastern Red Bat	Hoary Bat
MAJOR							
Superior Coastal Plain							
IMPORTANT							
Northern Lake Michigan Coastal							

Color Key

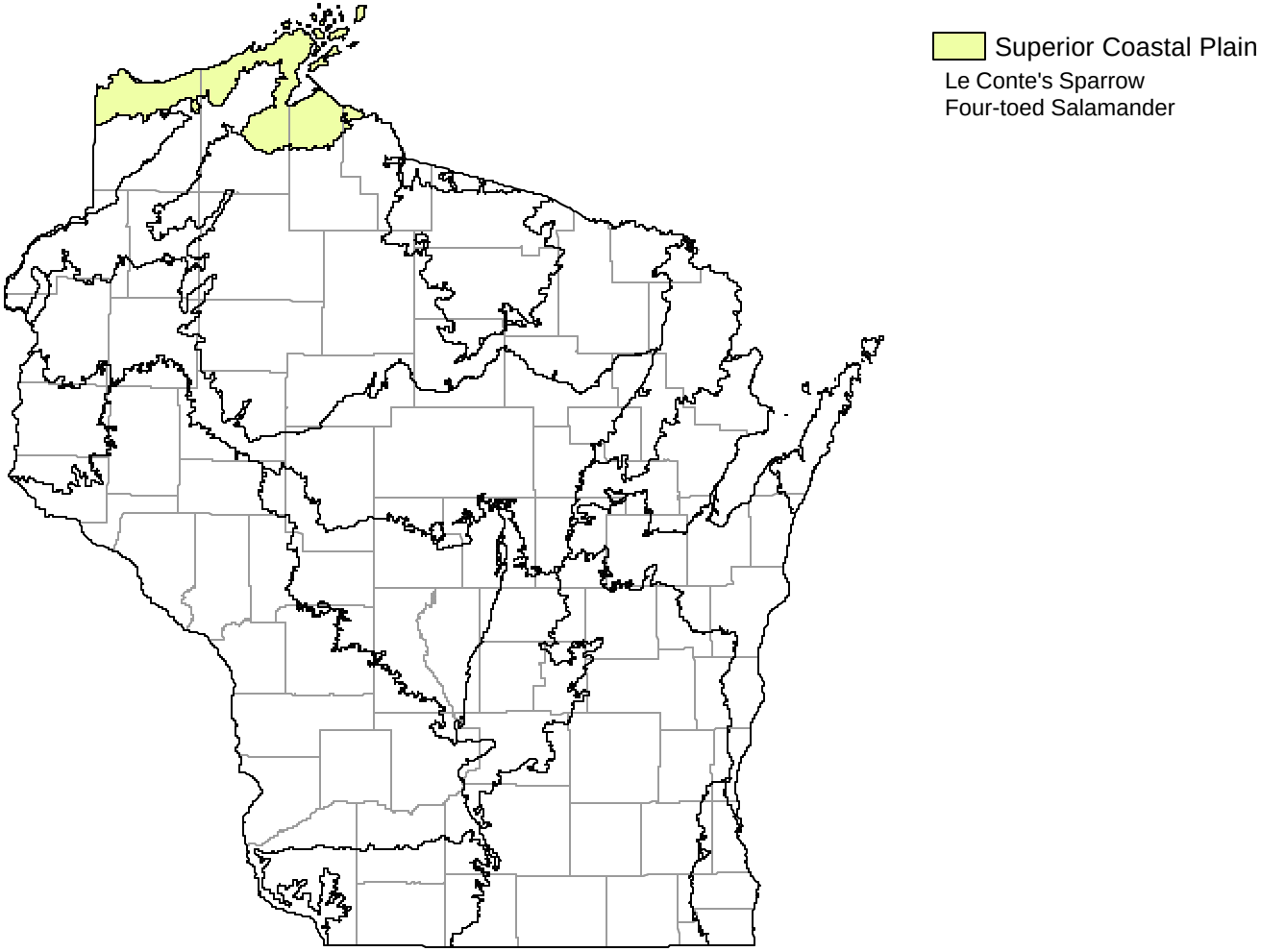
= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

*** The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.**

Figure 3-47. Vertebrate Species of Greatest Conservation Needthat have *both* a significant association with Great Lakes coastal fens *and* a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of Great Lakes coastal fens.



3.3.8.9.3 Threats and Priority Conservation Actions for Great Lakes Coastal Fens

3.3.8.9.3.1 Statewide Overview of Threats and Priority Conservation Actions for Great Lakes Coastal Fens

The following list of threats and priority conservation actions were identified for Great Lakes coastal fens in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.8.9.3.2 unless otherwise indicated.

Threats and Issues

- Great Lakes coastal fen is imperiled in Wisconsin, in part due to its geographic restriction and rarity of occurrence, and in part because of its great sensitivity to water quality changes.
- Dredging, filling, nutrient loading, sedimentation, and the spread of invasive species are major threats to these coastal wetlands.
- The vegetation appears to be quite sensitive to diminished water quality, especially eutrophication. Degraded wetlands that may have formerly supported wire-leaved sedge communities now support marshes composed of more tolerant plants such as cat-tails, bulrushes, bur-reeds, and arrowheads.
- Development of the sandspits that protect many of the coastal peatlands complexes can have both direct and indirect impacts.
- Loss of forest cover and reduction of conifer cover in local watersheds can lead to increased sediment load and erosion in local streams. Flood events on the streams that feed the coastal embayments supporting the peatlands can be more severe and damaging in watersheds that are not managed carefully.

Priority Conservation Actions

- Many of the most diverse and least disturbed sites are under the protective ownership of federal, state, local, and tribal governments. The development of programs to monitor community-level vegetation changes, rare species populations, the presence and abundance of invasive species, and water quality is a priority.
- Unlike coastal wetlands in many parts of the Great Lakes region, the peatlands, especially on Lake Superior, are a regionally significant repository of diversity. Invertebrate and plant surveys continue to reveal surprises that underscore the ecological importance of these peatlands.
- Additional survey work on Lake Michigan sites is needed to resolve classification issues and clarify relationships with similar peatlands elsewhere in Wisconsin and throughout the western Great Lakes region.
- Where possible, manage Great Lakes coastal fen with associated peatland communities, open water lagoons, sandspits, and upland forests.

3.3.8.9.3.2 Additional Considerations for Great Lakes Coastal Fens by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of Great Lakes coastal fen exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for Great Lakes coastal fen found in Section 3.3.8.9.3.1.

Additional Considerations for Great Lakes Coastal Fens in Ecological Landscapes with ***Major*** Opportunities for Protection, Restoration, and/or Management

Superior Coastal Plain

Great lakes coastal fens occur with other peatland types in coastal embayments that are concentrated on the northern edge of the Bayfield Peninsula, in the Apostle Islands archipelago (Apostle Islands Sandscapes State Natural Area and Big Bay State Park (Bayfield County). There are also coastal fens at the mouths of the two largest rivers entering Lake Superior from Wisconsin: the St. Louis and the Bad.

Even the more degraded sites (e.g., parts of the St. Louis River Estuary, Douglas County) have retained attributes of high value to some wildlife species. The intact sites merit the strongest level of protection possible.

Additional Considerations for Great Lakes Coastal Fens in Ecological Landscapes with ***Important*** Opportunities for Protection, Restoration, and/or Management

Northern Lake Michigan Coastal

Only a few fen-like peatlands occur on the Lake Michigan shore in direct contact with the waters of Lake Michigan. Toft Point State Natural Area (Door County) is one good example. More vegetation sampling is needed to define the community level affinities. However, detailed species lists obtained from several sites on the Door Peninsula have many similarities with the Lake Superior sites.